Fossil & Renewable Natural Gas in the LCFS

Public Working Meeting for Stakeholder Groups

December 2, 2016

Discussion Outline

- Introduction
- Fuel Pathways [45 minutes]
  - Fossil CNG Lookup Table Pathway
  - Simplified CI Application Forms
  - CI inputs Subject to Verification
- Fuel Reporting [45 minutes]
  - Potential Non-Regulatory Changes for Enhanced Reporting, and
  - Potential Regulatory Amendments to Reporting Requirements
- Verification [45 minutes]
- Next Steps

Tier 1 Pathways: North American Fossil NG and Landfill gas to CNG/LNG/L-CNG

Simplified CI Application Example

FUEL PATHWAY EVALUATION

Simplified CI Application Form

- *Summary:* Staff is staff is considering further simplification to the Tier 1 pathway application forms, as a replacement for the CA-GREET 2.0 Tier 1 Calculator.
- *Rationale:* To facilitate pathway CI application, evaluation, and verification: The form should eliminate the need for applicants to perform intermediate calculations to convert operational data into CA-GREET inputs. By limiting the fields in each fuel type's form, this would provide greater clarity on which data parameters are standard/default and which are user-specific and subject to verification.

QUESTION:

- Please review the draft form posted on the LCFS meetings page and provide feedback to identify raw, verifiable data that is metered or otherwise measured.
- Staff is seeking stakeholder feedback on the units of measurement at each data collection point.
- How can ARB simplify the application process? Is it clear what are defaults/user-defined?
- How can staff ensure that, when RNG is blended with fossil fuels prior to metered pipeline injection, only the renewable gas portion is appropriately accounted for in reported fuel quantities?

Simplified Application Form (1)

Operational Data for Feedstock Phase—Biogas Upgrading:

Data Years	Step 1) Select Feedstock Production Region							
	Select Regional Electricity Mix for Biomethane		1-U.S Ave Mix		Enter Maximum Pipeline Transmission Distance in mile			1,925
Process	Biogas Feedstock (at Inlet to Processing)		Inputs to Biogas Processing					
Monthly Data	Inlet Raw LFG Extraction, (metered)	Raw Biogas Quality (% Methane)	Facility Total NG from Utility Invoices	Facility Total Diesel from Invoices	Facility Total Propane (LPG) from Invoices	Other Fuel (note type and source documentation)	Facility Total Electricity from Utility Invoices	Biomethane Product Gas, (metered)
Unit	SCF at 60° F	%	MMBtu	Gallons	MMBtu	MMBtu	kWh	MMBtu
Month 1	37,376	54.0%	3155.4	0	280	0	4,032,210	999,256
Month 2	24,251	54.0%	2851.3	0	307	0	1,112,210	5,628,943
Month 3	54,251	54.0%	2851.3	0	307	0	1,112,210	46,895,123
Month 4	16,000	54.0%	2851.3	0	307	0	1,112,210	947,014
Month 5	4,251	54.0%	2851.3	0	307	0	1,112,210	580,000
Month 6	54,251	54.0%	2851.3	0	307	0	9,112,210	198,000
Month 7	1,000	54.0%	2851.3	0	307	0	1,112,210	107,014
Month 8	3,000	54.0%	2851.3	0	307	0	1,112,210	198,000
Month 9	2,000	54.0%	2851.3	0	307	0	1,112,210	1,989,555
Month 10	50,000	54.0%	2851.3	0	307	0	1,112,210	8,123,568
Month 11	60,000	54.0%	2851.3	0	307	0	1,112,210	1,900,000
Month 12	15,000	54.0%	2851.3	0	307	0	1,112,210	1,233,316
Month 13	12,000	54.0%	2851.3	0	307	0	1,112,210	5,615,301
Month 14	14,000	54.0%	2851.3	0	307	0	1,112,210	1,234,569
Month 15	9,000	54.0%	2851.3	0	307	0	5,000,000	5,980,562
Month 16	3,500	54.0%	2851.3	0	307	0	1,112,210	9,198,000
Month 17	1,000	54.0%	2851.3	0	307	0	1,112,210	5,510,000
Month 18	5,600	54.0%	2851.3	0	307	0	1,112,210	550,000
Month 19	1,200	54.0%	2851.3	0	307	0	1,112,210	89,565,662
Month 20	5,400	54.0%	2851.3	0	307	0	1,112,210	56,487,000
Month 21	1,900	54.0%	2851.3	0	307	0	1,112,210	12,356,895
Month 22	5,500	54.0%	2851.3	0	307	0	1,112,210	1,234,562
Month 23	5,000	54.0%	2851.3	0	307	0	1,112,210	980,000
Month 24	24,251	54.0%	2851.3	0	307	0	1,112,210	1,895,222
Total in HHV	409,729		68,735	0	7,346	0	41,500,841	259,407,562

Excel sheet available at: https://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/lcfs_meetings.htm

Simplified Application Form (2)

Operational Data for Fuel Phase—Compression/Liquefaction:

Data Years	Step 2) Select Region for CNG, LNG, and L-CNG Production					
	Select Regional Electricity Mix for Fuel Production			3-CAMX Mix		
Process	Inputs for LNG					
Monthly Data	NG as feedstock	LNG Production	NG as process fuel	Electricity from Utility Invoices	LNG Transport and Distribution	
Unit	MMBtu	Gallons	MMBtu	kWh		miles
Month 1	184,379	2,173,772	0	2,955,895	Select to affirm truck and storage tanks are equipped with **Boil-Off Recovery**	No
Month 2	184,379	10,173,772	0	3,055,895		
Month 3	184,379	12,173,772	0	3,155,895		
Month 4	184,379	2,173,772	0	2,955,895	Enter Maximum LNG Transport Distance by **Heavy Duty Diesel Truck**	5
Month 5	184,379	2,173,772	0	2,955,895		
Month 6	184,379	2,173,772	0	2,955,895	Enter Maximum LNG Transport Distance by **Heavy Duty LNG Truck**	45
Month 7	184,379	2,173,772	0	2,955,895		
Month 8	184,379	2,173,772	0	2,955,895		
Month 9	184,379	2,173,772	0	2,955,895		
Month 10	184,379	2,173,772	0	2,955,895		
Month 11	184,379	2,173,772	0	2,955,895		
Month 12	184,379	2,173,772	0	2,955,895		
Month 13	184,379	2,173,772	0	2,955,895		
Month 14	184,379	2,173,772	0	2,955,895		
Month 15	184,379	2,173,772	0	2,955,895		
Month 16	184,379	2,173,772	0	2,955,895		
Month 17	184,379	2,173,772	0	2,955,895		
Month 18	184,379	2,173,772	0	2,955,895		
Month 19	184,379	2,173,772	0	2,955,895		
Month 20	184,379	2,173,772	0	2,955,895		
Month 21	184,379	2,173,772	0	2,955,895		
Month 22	184,379	2,173,772	0	2,955,895		
Month 23	184,379	2,173,772	0	2,955,895		
Month 24	184,379	2,173,772	0	2,955,895		
Total in HHV	4,425,104	70,170,528	0	71,241,480		

Excel sheet available at: https://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/lcfs_meetings.htm

Addition of North American Fossil NG to CNG to the Lookup Table

- *Summary:* Staff could develop a default Lookup Table value for NA pipeline NG to CNG for use by all CNG stations.
- *Rationale:* Most inputs to modeling the CI are regional average or default values from CA-GREET 2.0; the only user-specific inputs in the Tier 1 calculator are:

  (1) transmission distance from origin to the fueling facilities, and

  (2) energy use for compression at the fueling facility.
- *Important considerations:* The Lookup table Pathway CI may be higher than some station-specific pathways; however, potential savings in simplified verification requirements (transactions only, no CI review) may be worth the trade-off.

QUESTION:

- *Would reporting parties for NG to CNG prefer to use a Lookup Table CI?*

Potential Non-Regulatory Changes for Enhanced Reporting, and Potential Regulatory Amendments to Reporting Requirements

FUEL REPORTING

How to Register and Report Per Fueling Facility in LRT-CBTS

- Administrative Improvements Implemented for Q1 2017
  - New template to register all fueling facilities in LRT-CBTS (see below), instead of AFP (Production facility registration remains in AFP)
  - The list of fueling facilities needs to be updated quarterly (if any changes)
  - Report fuel amount dispensed by FPC at each individual fueling facility, using a unique LCFS fueling facility ID that will be generated upon registration.

LRT-CBTS FORM FOR FUELING FACILITY REGISTRATION

Company Name	FEIN	Fueling Facility Name	Street Address	City	Zip Code	Meter # or OEM Serial #	Fuel Type	FPCs	Application Type	Longitude	Latitude

CNG Fueling Facility IDs

- *Summary:* Use the natural gas utility meter number as the basis for a unique LCFS identifier for each CNG fueling facility.
- *Rationale:* Facility-specific IDs would help avoid double counting and facilitate verification. Using the utility meter number ensures it is unique and can be matched to utility invoices.

QUESTIONS:

- Does basing unique identifiers on utility meters for each CNG fueling facility make sense?
- What are current industry standards for identifying fueling facilities, if any?

Limit Transaction Types to Dispensed Amounts

- *Summary:*
  - Eliminate all upstream transaction types for NG
  - Have only one transaction type—"Natural Gas Vehicle (NGV) fueling" representing dispensed Amounts at Fueling Facilities
  - Does not affect who is eligible to report or generate credits for a specific quantity of fuel but it requires the credit generating party to track transfers through the supply chain, and ultimately attest that accurate fuel volumes with the appropriate FPCs
- *Rationale:* To streamline reporting and verification. Ensure the fuel is used for transportation in California

QUESTIONS:

- Contractually possible to work out agreements to have all necessary information to track the fuel amounts, FPC, and vehicle application type through the supply chain?

Third-party Aggregators

- *Summary:* Allow aggregators to generate credits on behalf of CNG station owners.
- *Rationale:* To increase participation and facilitate sale of LCFS credits.
- *Important considerations:* CNG station owners could contractually designate a third party to manage reporting and credit generation. The aggregator would become the reporting party—in addition to generating credits, aggregators accept verification responsibility.

QUESTIONS:

- Would you be likely to take advantage of this option? Will this reduce administrative burden? Improve economic benefits of LCFS? Do you foresee issues contractually working out agreements?
- Should staff consider allowing aggregators for LNG, L-CNG and other fuels?

Verification Overview

Example: Landfill Gas to Bio-CNG

Fossil CNG, LNG, L-CNG

VERIFICATION

Verification Overview (1)

- *Summary:* Supplement work of ARB staff with addition of mandatory verification conducted by accredited, impartial third-parties engaged by the first LCFS reporting party:
  - Fuel pathway carbon intensities
  - Reported fuel quantities
  - Chain-of-custody information

- *Rationale:* Needed to ensure integrity in LCFS credit market through assurance of GHG reduction claims and to improve consistency with international standards for verification

Verification Overview (2)

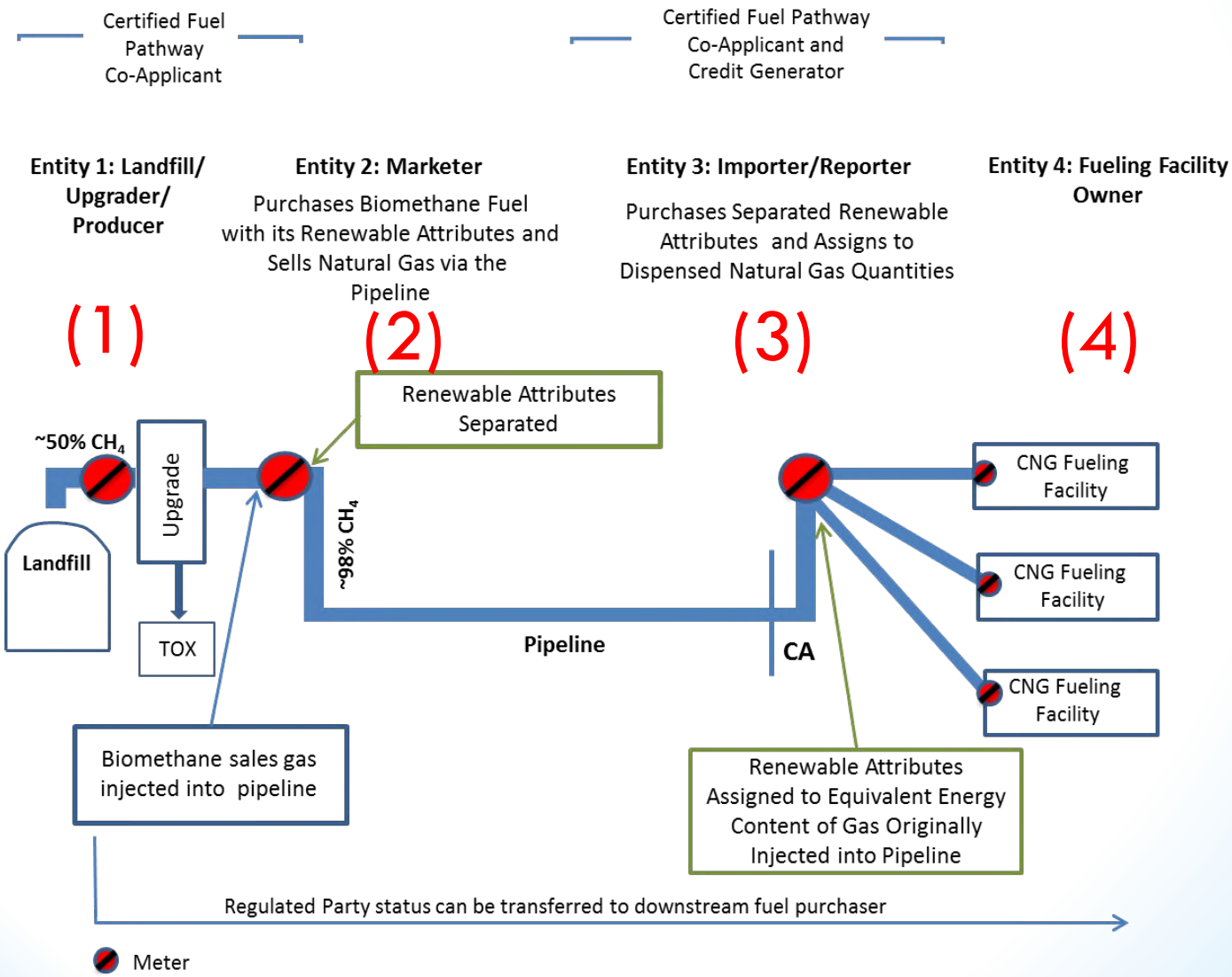
- *Important Considerations—Guiding Principles:*
  1. ARB retention of sole authority over the LCFS program, including verification requirements, as bestowed through the State's legislative and regulatory process;
  2. Continual improvement in the detection, prevention, and correction of errors or fraud;
  3. Identification and implementation of cost reducing strategies, while maintaining verification rigor;
  4. Policy consistency with other ARB verification programs; and
  5. Consideration of the unique attributes of fuel carbon intensities and fuels marketing structure.

Verification Questions

LF → Bio-CNG Supply Chain

- Written feedback welcome.
- Most credit generators are continually improving business practices to support supply chain verification. We would like to invite stakeholders to discuss their controls and recordkeeping practices with us.
- Are you currently registered and generating RINs or Q-RINs under U.S. EPA's RFS2? If so, what controls and recordkeeping practices have been implemented?

Ex. Landfill→ Bio-CNG Supply Chain



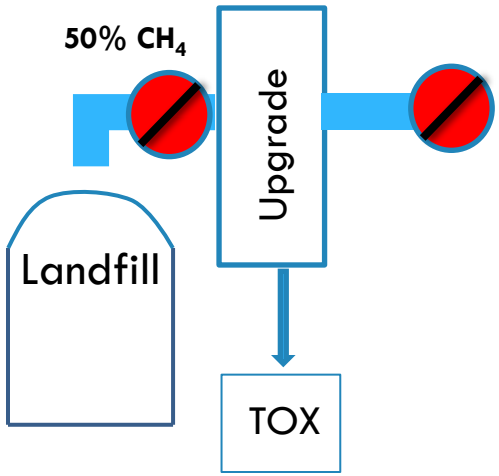
Verification of Feedstock Phase – Landfill/Upgrading Facility (1a)

- *Summary:*
  - Geographic coordinates and process flow
  - Monthly energy balance on biomethane production
  - Contracts and sales invoices for physical fuel and renewable attributes accounting

- *Rationale:* Needed to assure landfills and upgraders operate consistent with certified CI requirements and maintain proper accounting and traceability practices for all renewable attributes

- *Important Considerations:*
  - Majority of operations that contribute to CI occur in upgrading stage; therefore, must arrange for ARB and verifier access
  - Biomethane sales and associated renewable attributes should not exceed production quantities.

Verification of Feedstock Phase – Landfill/Upgrading Facility (1b)



QUESTIONS

- What would be an appropriate frequency for landfill and upgrading facility document reviews and site visits for verification of geographic location, facility setup, quantification of fuel production, and controls for issuance of renewable attributes?

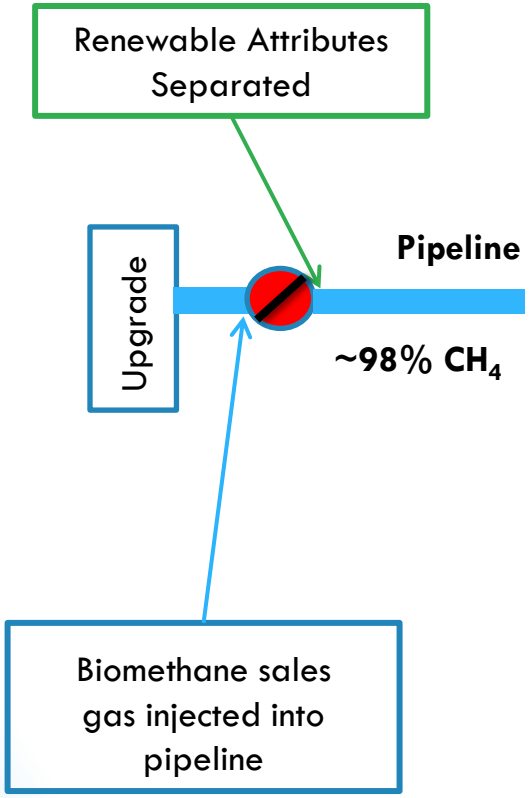
Verification of Transport Phase – Intermediate Marketer (2a)

- *Summary:*
  - Review of contracts and invoices for physical gas transactions and renewable attributes between landfill, upgrader, and next entity along the supply chain
  - Meter readings at injection into pipeline to support review of biomethane sales

- *Rationale:* Needed to assure physical biomethane transactions and renewable attributes accounting

- *Important Considerations:* Marketer is responsible for establishing chain-of-custody for the renewable attributes from the landfill/upgrader through the biomethane marketer to the biomethane importer.

Verification of Transport Phase – Intermediate Marketer (2b)



QUESTIONS

- Staff would like to understand how common the simplest supply chain is for biomethane suppliers vs. cases with multiple intermediaries ?
- Do more intermediaries increases the risk of fraud or error?

Simple case:
LF/upgrader → reporter → fueling facility

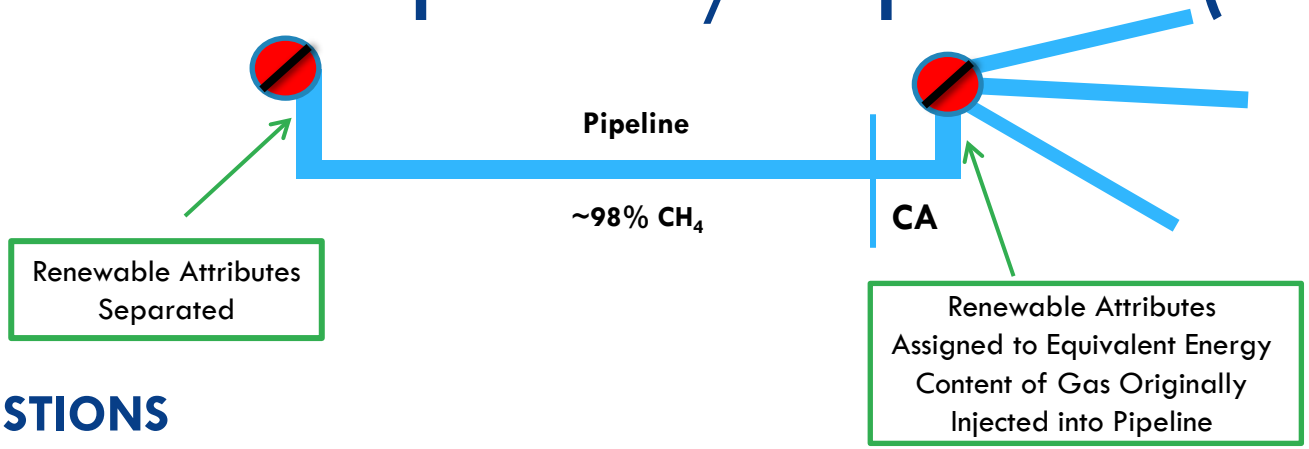
Verification of Fuel Delivery Phase – Importer/Reporter (3a)

- *Summary:*
  - Review contracts, invoices and other documentation to support credits generated.
  - Verify annual attestations made by all entities in supply chain of no double counting of renewable attributes.

- *Rationale:* Needed to assure credit generator has agreements and controls in place that are effective over the supply chain to ensure certified CI is not exceeded and to ensure proper accounting and traceability practices resulting in bio-CNG credits.

- *Important Considerations:* Reporter is responsible for correctly reporting fuel quantities by vehicle type and FPC which results in LCFS credit generation; therefore, should have monitoring plan and arrange for ARB and verifier access to facilities, personnel, and records across the supply chain.

Verification of Fuel Delivery Phase – Importer/Reporter (3b)



QUESTIONS

- What current practices would support traceability of physical fuel and renewable attributes to mitigate risk of double counting?
- What should staff consider when proposing a balancing period for renewable attributes? For example, staff is considering RNG injected in a given month only be carried over to the following month for reporting as bio-CNG, bio-LNG, or bio-L-CNG.
- Staff is seeking stakeholder feedback on whether written guidance or regulation text is needed to specify permitted contracting practices along the supply chain for biogas, biomethane, and renewable attributes.

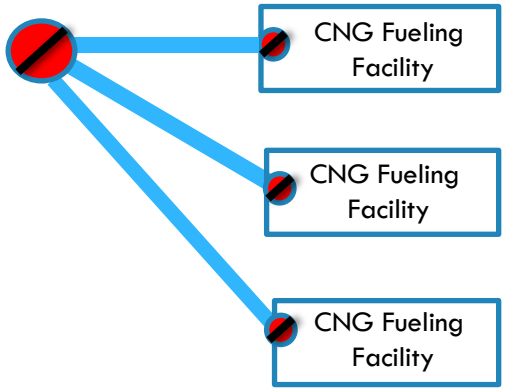
Verification of Fuel Dispensing Phase – Fueling Facility (4a)

- *Summary:* Verification requirements at fueling facility:
  - CNG dispensed at each fueling facility by vehicle type by FPC
  - Agreements with bio-CNG reporting entity
  - Utility bills for metered therms
  - Allocation method per vehicle type
  - Total CNG dispensed at each fueling facility

- *Rationale:* Needed for fueling station owners to demonstrate fuel quantities dispensed into vehicles

- *Important Considerations:* Staff seeking cost reducing strategies, while maintaining verification rigor

Verification of Fuel Dispensing Phase – Fueling Facility(4b)



QUESTIONS

- For credit generators with a single fueling facility, how frequently should site visits be required?
- For credit generators with multiple fueling facilities, how frequently should site visits be required? For example, if more than X facilities, Y%/year visited.
- Should changes in ownership/ operational control or past reporting errors trigger more frequent site visits?

Verification – Fossil CNG

Dispensing

Data	Documents
Fossil CNG	
Quantity of NG extracted from pipeline and compressed at CNG fueling facility	Quarterly LRT reports, utility bills
Total quantity of CNG dispensed	Meter readings as a cross check

QUESTIONS:

- Staff is seeking stakeholder discussion and feedback on fueling facility site visit coverage and frequency. We would like to hear from both credit generators with a single fueling station and from credit generators with multiple fueling stations.

Verification – Fossil LNG &L-CNG

Production, Transport, and Dispensing

Data	Documents
Fossil LNG and Fossil L-CNG	
Quantity of NG extracted from pipeline at liquefaction facilities	Utility bills, liquefaction facility meter data
Quantity of LNG produced in liquefaction facilities, energy use	Monthly production report by liquefaction company, meter data
Quantity of LNG delivered to LNG fueling facilities in CA, transport mode, and maximum distance	Truck delivery records (i.e. Bills of Lading), confirmation that LNG (not CNG) was dispensed, LNG dispensed meter data
Quantity of LNG delivered to CNG fueling facilities in CA and re-gasified, transport mode, and maximum distance	Compare truck delivery records (i.e. Bills of Lading) to CNG dispensing meter data

QUESTIONS:

- What is an adequate frequency for verification of the liquefaction facility to ensure compliance?
- Staff is seeking stakeholder discussion and feedback on required fueling facility site visit coverage and frequency. For example, if a credit generator has more than X number of fueling station locations, then Y% of the locations should be visited in each year.

Anticipated Next Webinar Topics

- Feedback and updates on topics from this webinar
- RNG verification considerations for anaerobic digesters, livestock waste treatment, wastewater treatment
- Considerations for small credit generators
- Progress on landfill biogas supply chain considerations
- Considerations for reporting party CI sensitivity analysis and monitoring plans/management systems
- Possible triggers requiring more frequent verifications and increases in sampling requirements
- Suggestions from stakeholders?

Attend 2017 LCFS Workshops for topics affecting all fuels

Background slides for Reference

- Figures and Tables

Table 1. Eligible Parties for Natural Gas and Biomethane

Eligible Party	Number of Participating Entities
CNG Fueling Facilities including Public Transit Agencies	48
Bio-CNG Producers	28
LNG Producers	2
Importer/Marketers	2

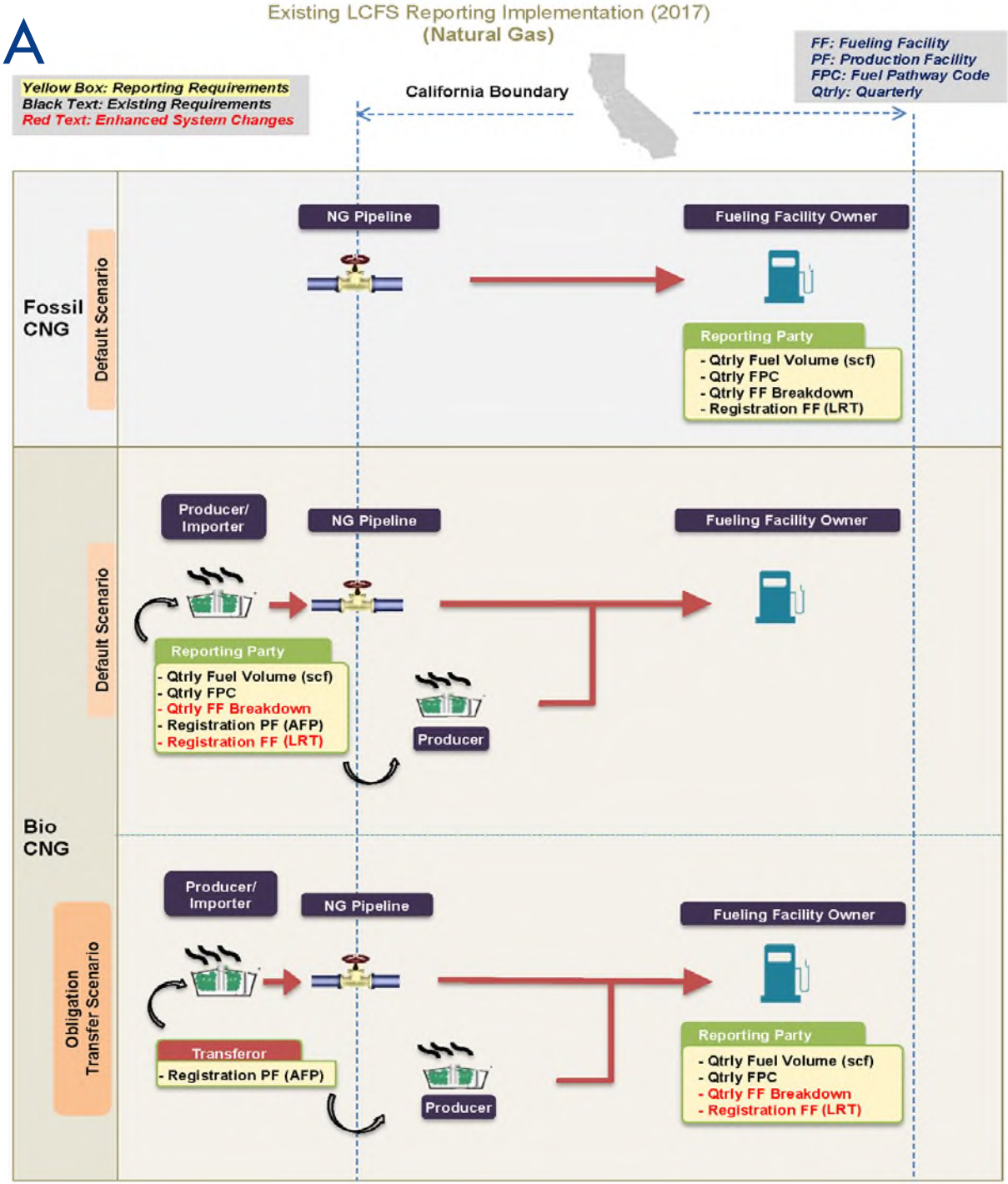
[1] LCFS regulation section 95483(d).

Table 2. Current operational data requirements for Tier 1 NG pathway applications

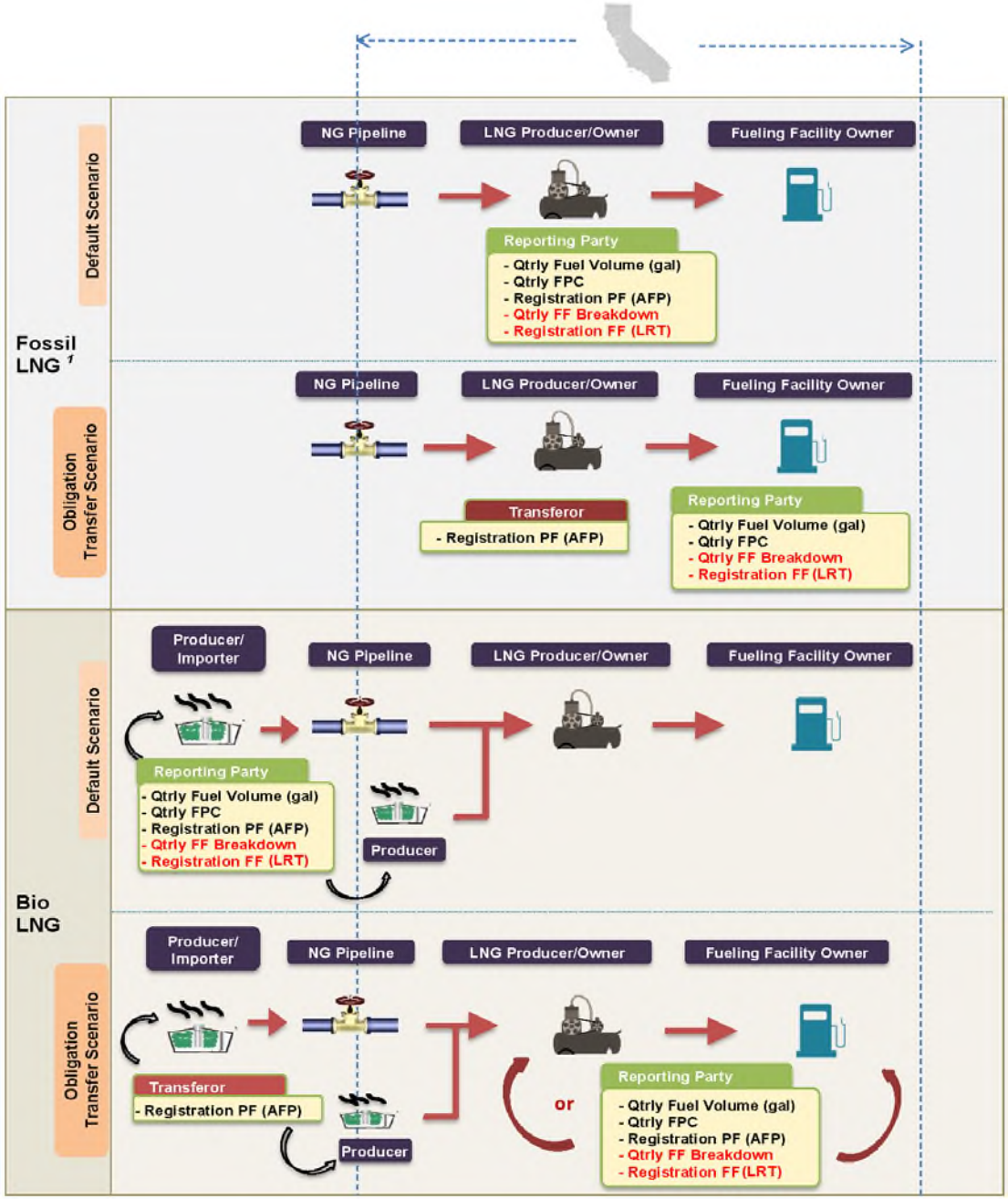
A Tier 1 pathway application for <u>Landfill Gas</u> includes 24 months of the following monthly operational data:	Metered quantity of biogas captured and withdrawn from the landfill (typically measured in cubic feet per minute, logged over a time period in SCF at 60°F, and converted to MMBtu)
	Methane content of biogas (in percent)
	All process energy used in biogas cleanup operations including: - Electricity (in kwh) - Fossil NG (in MMBtu) - Raw biogas or biomethane (MMBtu) - Propane or LPG (in MMBtu) - Diesel (in gallons)
	Pipeline transmission distance (miles)— maximum distance from source to refueling station
	Methane content (%) biomethane after upgrading
	Metered quantity of biomethane produced for pipeline injection (in MMBtu)
A Tier 1 pathway application for <u>CNG</u> includes 24 months of the following monthly operational data:	If Bio-CNG, these requirements are in addition to data for landfill gas pathways above
	Either - Electricity (kwh) used for compression at the dispensing station, and - Metered quantity of CNG (in MMBtu) dispensed, **OR** - CA-GREET default compression efficiency (in kWh/MMBtu)
	Pipeline transmission distance (in miles) - A default pipeline transmission distance of 1000 miles is used for all fossil-based CNG pathways
A Tier 1 pathway application for <u>LNG or L-CNG</u> includes 24 months of the following monthly operational data:	If Bio-LNG or Bio-L-CNG, these requirements are in addition to data for landfill gas pathways above
	All process energy inputs to liquefaction including: - Electricity (in kWh) - Fossil NG (in MMBtu)
	Quantity of LNG (in gallons of LNG) produced
	Transport mode (Heavy Duty Diesel Truck or Heavy Duty LNG Truck)
	Maximum distance LNG is transported to farthest station (in miles)
	L-CNG pathways use CA-GREET default efficiency for regasification and compression (in kWh/MMBtu)

Appendix A

Fossil and Bio-CNG

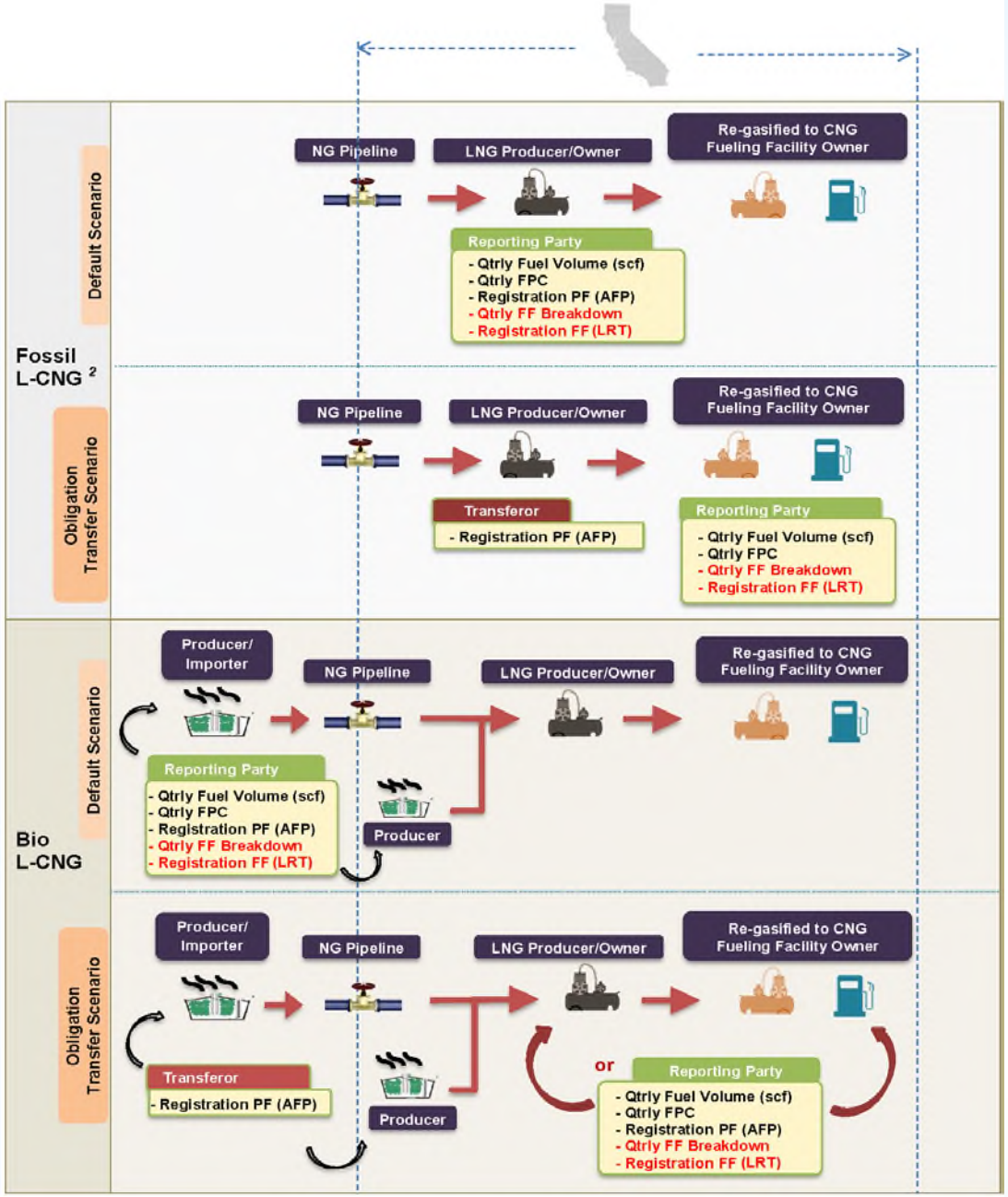


Fossil and Bio-LNG



[1] *Initial regulated party for fossil LNG is the entity that owns the fossil LNG right before it is transferred to storage at the facility at which the liquefied blend is dispensed to motor vehicles for their transportation use. This will hold true even if that entity is an out-of-state entity. In that case, the out-of-state entity would be subject to reporting requirements as shown above.*

Fossil and Bio L-CNG



[2] *Where no Bio-LNG is added to Fossil LNG prior to compression to CNG, the regulated party is initially the entity that owns the fossil LNG right before it is transferred to the facility at which the fossil LNG is re-gasified and dispensed to motor vehicles for their transportation use. This will hold true even if that entity is an out-of-state entity. In that case, the out-of-state entity would be subject to reporting requirements as shown above.*